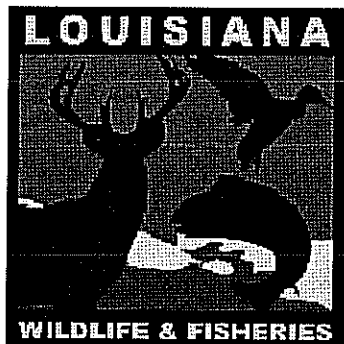


SOLICITATION FOR SERVICES

**“Analytical and Consulting Services – Seafood Safety Response Related -
Organics”**

**LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES
AND
LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY**



**SFS No: 7100-12-02
September 1, 2011**

**Solicitation Response Due Date/Time:
September 8, 2011, 3:00 P.M. CDT**

SOLICITATION FOR SERVICES

“Analytical and Consulting Services – Seafood Safety Response Related - Organics”

**Louisiana Department of Wildlife & Fisheries
and
Louisiana Department of Environmental Quality**

1.0 ADMINISTRATIVE INFORMATION

1.1 Solicitation for Services (SFS)

The Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Department of Environmental Quality (LDEQ) are responsible for the monitoring and assessment of environmental conditions in areas impacted by the Mississippi Canyon MC252 Oil Spill. To assure the public that Louisiana seafood is safe for consumption, analysis of water and sediment in coastal Louisiana waters is required. This project shall require contractor services for laboratory analyses as specified in the Attachment 2, Scope of Services. It is anticipated that one contract is to be awarded.

The LDWF and LDEQ require the services of a contractor to perform laboratory analyses as specified in Attachment 2, Scope of Services.

This is not a Request for Proposal.

The goal is to assure the public that Louisiana seafood is safe for consumption. The objective is to provide quality analytical data to support LDWF's and LDEQ's monitoring and assessment activities.

1.2 Contract Term and Compensation

The term of the contract resulting from this SFS will be approximately for 6 months, beginning approximately October 1, 2011 to March 31, 2012.

Compensation for contract services will be based on the rates listed in Attachment 3, Schedule of Prices. This contract and any amendments require the approval of the LDWF and LDEQ.

1.3 Submission of Solicitation Responses

All solicitation responses can either be submitted by email to sharon.schexnayder@la.gov, by Fax to (225) 219-3823 or in person to Sharon Schexnayder, Financial Services Division, 602 N. Fifth Street – Galvez Building, Baton Rouge, LA 70802 **no later than 3:00 p.m. CDT on or**

before September 8, 2011. Solicitation responses should not be delivered to LDWF. Any solicitation responses received after this date and time will not be considered.

Mail through the U. S. Postal Services is not delivered directly to the LDEQ headquarters building. Therefore, bidders are advised to hand deliver or send their solicitation responses by some means other than the U.S. Mail. Bidders are further advised not to wait until the last day to dispatch their solicitation responses. Maximum competition is encouraged but time extensions for messenger delays, traffic, fogbound airplanes, or other causes will not be granted. Bidders are solely responsible for the timely delivery of their solicitation responses. The LDEQ will not acknowledge by mail or telephone timely receipt of solicitation responses.

1.4 Changes, Addendum, or Withdrawal of Solicitation Responses

Any changes or addenda to a solicitation response must be submitted in writing, signed by an authorized representative of the bidder, cross-referenced clearly to the relevant solicitation section, and received by the LDEQ prior to the solicitation response due date and time. All changes and addenda must meet all requirements for the solicitation response. Any bidder choosing to withdraw its solicitation response must submit a written withdrawal request to the LDEQ.

1.5 SFS Schedule Summary

The events and dates summarized in Table 1 represent milestones in the LDEQ's SFS process; however, the LDEQ reserves the right to deviate from this schedule.

Table 1. SFS Schedule Summary

Event	Date	Local Time
LDEQ sends Solicitation for Services to prospective bidders	09/01/2011	
Solicitation Response due date and time	09/08/2011	3:00 pm
Estimated award date	Approximately 09/12/2011	
Estimated initiation of the contract period	Approximately 10/01/2011	

2.0 GENERAL INFORMATION

2.1 Corporation Requirements

If the tentatively selected Contractor is a corporation not incorporated under the laws of the State of Louisiana, the Contractor shall have obtained a Certificate of Authority pursuant to La. R.S. 12:301-302 from the Louisiana Secretary of State, Corporations Division, 3851 Essen Lane, Baton Rouge, Louisiana, 70809, (225) 925-4704. The Certificate of Authority must be provided prior to contracting with the LDWF and LDEQ.

If the tentatively selected Contractor is a for-profit corporation whose stock is not publicly traded, the Contractor shall ensure that a Disclosure of Ownership Affidavit has been properly filed with the Louisiana Secretary of State's office before contracting with state government. The Disclosure of Ownership Affidavit must be provided prior to contracting with the LDWF and LDEQ.

2.2 Laboratory Accreditation

In accordance with LAC 33:I.4501, any commercial laboratory (as defined in LAC 33:I.4503) shall be accredited by the Louisiana Environmental Laboratory Accreditation Program (LELAP) prior to commencing analytical work. Each such laboratory must be certified for the method/matrix/analytes necessary to perform the analytical work required in Attachment 2, Scope of Services, Attachment 3, Schedule of Prices and Exhibit 1. The LDWF and/or LDEQ shall not accept analytical data generated by any commercial laboratory that is not accredited by LELAP in accordance with LAC 33:I.4501 through 5915.¹ All analytical data must be submitted in a format approved by the LDWF and/or LDEQ Project Manager and shall meet the requirements of LAC 33:I.5313 and the 2003 National Environmental Laboratory Accreditation Conference (NELAC) Standards.

Any laboratory other than a commercial laboratory (as defined in LAC 33:I.4503) shall meet at a minimum the quality systems requirements found in LAC 33:I.Chapter 53 and in Chapter 5 of the 2003 NELAC Standards. All analytical data must be submitted in a format approved by the LDWF and/or LDEQ Project Manager and meet the requirements of LAC 33:I.5313 and the 2003 NELAC Standards

Evidence of LELAP accreditation for any/all laboratories proposed to be used by the successful Contractor shall be provided and approved by the LDEQ before work begins.

2.3 Solicitation Response Costs

Contractors are responsible for all costs incurred for the preparation of their solicitation responses. Solicitation responses received in response to this SFS are subject to the Louisiana Public Records Law and become the property of the LDEQ and will not be returned.

¹ See LAC 33:I.5911 for acceptance of accreditation from another NELAP accrediting authority.

3.0 SOLICITATION PREPARATION INSTRUCTIONS

3.1 Required Elements for Solicitation Response

Each bidder should address the elements described by this section in his Solicitation Response. **Any solicitation response that does not include the following mandatory items shall be disqualified by the LDWF and LDEQ and shall not be evaluated:**

3.1.1 Solicitation for Services Cover Sheet

Each bidder must complete Attachment 1, Solicitation for Services Cover Sheet.

3.1.2 Schedule of Prices

Each bidder shall submit a price bid using the LDWF and LDEQ's pricing structure provided in Attachment 3, Schedule of Prices. No other format is acceptable. **Solicitation responses not including a Schedule of Prices shall be disqualified.** Additionally, all blanks on the Schedule of Prices must be completed. For items with no charge, "\$0" must be entered. If a bidder identifies deficiencies or errors in this format, he should bring this information to the attention of the LDEQ. The LDEQ will review the information and if necessary will issue any correction as an amendment to the solicitation.

Only Attachment 3, Schedule of Prices will be considered in evaluating the solicitation responses. The bidder is advised to not include any additional terms and conditions, company fee schedules, etc., as they will not be considered.

Each bidder is solely responsible for the accuracy and completeness of its solicitation response.

3.1.3 Evidence of LELAP Accreditation

At the time of solicitation response, the bidder shall provide evidence, as the prospective prime contractor or via accredited named subcontractor, of one of the following for each test (for method/matrix/analyte) listed in Attachment 3, Schedule of Prices Part 1:

- (a) current LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1;
- (b) prior application for LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1; and/or
- (c) a certification that the bidder or bidder's subcontractor is already otherwise accredited to and/or is performing the method, along with a statement of intent to apply for LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1, within five (5) business days of notice of contract award, either as prime contractor or via subcontractor. This statement shall be provided on the prime bidder's company letterhead, signed by bidder's authorized representative, and state which prospective contractor (prime or named subcontractor) will apply for accreditation.

4.0 SOLICITATION RESPONSE EVALUATION AND SELECTION PROCESS

All solicitation responses containing the required mandatory items listed in 3.1 above will be evaluated according to the following weighted criteria:

4.1 Total Evaluation Price Criteria

The following table will be used to determine the total evaluation price.

Table 2. Summary of Solicitation Response Total Evaluation Price Calculation

Description	Analytical Method	Minimum Detection Limit	Payment Unit	No. of Units	Unit Rate	Line Total
PAHs including alkyl homologues by gas chromatography with low resolution mass spectrometry using selected ion monitoring (GC/MS-SIM). The analytical procedure is based on EPA Method 8270D with the GC and MS operating conditions optimized for separation and sensitivity of the target analytes. Alkyl PAH homologues are quantified using a response factor assigned from the parent PAH compound. Analytes and associated response factors are listed in Exhibit 1 Table 1.	EPA 8270D (GC/MS-SIM) or LDEQ approved method	Water 1-5 ng/L	per sample	360	\$	\$
		Sediment 0.1-0.5 ng/g dry weight	per sample	216	\$	\$
Extended list of VOCs for a specialized fingerprinting analysis of paraffins, isoparaffins, aromatics, naphthenes, and olefins (PIANO) by GC/MS. Analytes are provided in Exhibit 1 Table 2.	EPA 8260B (GC/MS) or LDEQ approved method	Water 0.2 - 2.0 ug/L	per sample	2	\$	\$
		Sediment 0.1 - 10 ng/g	per sample	2	\$	\$
Quantitative analysis (absolute concentrations of target analytes) of petroleum biomarkers by GC/MS-SIM. The target analyte list for quantitative biomarkers is provided in Exhibit 1 Table 3. This list may be expanded if warranted.	GC/MS-SIM or LDEQ approved method	Water 10 ng/L	per sample	2	\$	\$
		Sediment 2 ug/kg dry weight	per sample	2	\$	\$

Qualitative analysis of petroleum biomarkers by GC/MS-SIM with monitoring of selected ions (m/z) as provided in Exhibit 1 Table 4. Patterns/fingerprints must also be interpreted by the laboratory to identify source oil. Since no concentration data are generated by qualitative analysis the results are reported as hardcopy PDF files of each ion over the appropriate retention time(s) and scale. Costs for interpretation of the fingerprints for the source oil must also be included in the price listed for qualitative analysis.	GC/MS-SIM or LDEQ approved method	Water	per sample	2	\$	\$	
		Sediment	per sample	2	\$	\$	
Subtotal of Part 1							\$
Using all Multipliers Provided in Part 2 of the Schedule of Prices	Apply each multiplier to the Subtotal of Part 1:			% per Sample Delivery Group			
	Fully supported data package			%		\$	
	Accelerated Turn Around Time - 3 days			%		\$	
	Accelerated Turn Around Time - 7 days			%		\$	
	Accelerated Turn Around Time - 14 days			%		\$	
	Accelerated Turn Around Time - 21 days			%		\$	
Subtotal of Part 2							\$
Commencement Conference at LDEQ Headquarters			Lump Sum	1	\$	\$	
Commencement Conference - conference call			Lump Sum	1	\$	\$	
Subtotal of Part 3							\$
Total Evaluation Price							\$

The Total Evaluation Price is for evaluation purposes only, and does **not** reflect the contract amount to be awarded, or the anticipated cost of services to be provided by the successful Contractor.

The three lowest bids submitted to the LDEQ, based on Table 2 above, will be reviewed by an Evaluation Committee of LDEQ's technical personnel.

4.2 Accreditation Criteria

The three (3) lowest bids will be ranked according to the following criteria:

1. current LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1;
2. prior application for LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1; or
3. a certification that the bidder or bidder's subcontractor is already otherwise accredited to and/or is performing the method, along with a statement of intent to apply for LELAP accreditation for all tests listed in Attachment 3 and Exhibit 1 within five (5) business days of notice of contract award, either as prime contractor or via subcontractor. This statement shall be provided on the prime bidder's company letterhead, signed by bidder's authorized representative, and state which prospective contractor (prime or named subcontractor) will apply for accreditation.

The bidder with the highest rank will be tentatively awarded the contract.

In the event that two (2) or more of the three (3) lowest bids receive the highest rank, the lowest of those bids will be tentatively awarded the contract.

The tentatively selected Contractor, unless it has an application pending or is already accredited, must submit an application for LELAP accreditation to LDEQ within five (5) business days of receipt of notice of contract award. If proof of LELAP application is not submitted within the required time, if a first notice of deficiency is issued in response to the LELAP application and deficiencies are not corrected within five (5) business days of receipt of notice, or notice is issued by LELAP that accreditation will not be granted, the tentatively selected Contractor may be notified that its solicitation response is no longer acceptable and another Contractor will be tentatively selected.

In accordance with the provisions of R.S. 39:2182, in awarding contracts after August 15, 2010, any public entity is authorized to reject the lowest bid from, or not award the contract to, a business in which any individual with an ownership interest of five percent or more, has been convicted of, or has entered a plea of guilty or nolo contendere to any state felony or equivalent federal felony crime committed in the solicitation or execution of a contract or bid awarded under the laws governing public contracts.

Persons making solicitation responses are responsible for compliance with the Louisiana Code of Governmental Ethics (La. R. S. 42:1101, *et seq.*) in submitting the solicitation response seeking a contract with one or more state agencies. The Louisiana Code of Governmental Ethics applies to this solicitation and to the contract that may be awarded, as well as to performance under that contract. For more information, consult the Louisiana Board of Ethics, www.ethics.state.la.us.

Attachments to this SFS:

Attachment 1	Solicitation for Services Cover Sheet
Attachment 2	Scope of Services
Attachment 3	Schedule of Prices
Exhibit 1	Parameter List for Organics

ATTACHMENT 1
Solicitation for Services Cover Sheet

Project Title: "Analytical and Consulting Services – Seafood Safety Response Related - Organics"

Proposer:

Company Name: _____

Company Address: _____

Proposers' Contact Person:

Name _____ Title _____

Address: _____

Telephone No. (_____) _____ FAX No. (_____) _____

Email Address: _____

Subcontractors (add lines as necessary):

Name

I hereby certify that:

1. This Solicitation Response will remain in effect for at least ninety (90) days from the solicitation response due date.
2. I possess an established system of accounting and financial controls adequate to permit the effective administration of this contract or willingness to modify the present system to meet State of Louisiana requirements.
3. I will be ready and able to begin work within fifteen (15) days after contract award.
4. I am authorized to represent _____ and can commit the organization to all provisions of this Solicitation for Services.
5. Proposer certifies, by signing and submitting a solicitation response for \$25,000 or more, that their company, any subcontractors, or principals are not suspended or debarred by the General Services Administration (GSA) in accordance with the requirements in OMB Circular A-133 (A list of parties who have been suspended or debarred can be viewed via the internet at www.epls.gov).

Signature

Date

ATTACHMENT 2
SCOPE OF SERVICES
“Analytical and Consulting Services – Seafood Safety Response Related - Organics”

Louisiana Department of Wildlife and Fisheries
and
Louisiana Department of Environmental Quality

1.0 INTRODUCTION

The Louisiana Department of Wildlife and Fisheries (LDWF) and the Louisiana Department of Environmental Quality (LDEQ) are responsible for the monitoring and assessment of environmental conditions in areas impacted by the Mississippi Canyon MC252 Oil Spill. To assure the public that Louisiana seafood is safe for consumption, analysis of water and sediment in coastal Louisiana waters is required. This project shall require contractor services for laboratory analyses as specified in the Attachment 3, Schedule of Prices. It is anticipated that one contract is to be awarded.

Any laboratory providing analytical services to LDWF and LDEQ shall be Louisiana Environmental Laboratory Accreditation Program (LELAP) accredited in accordance with LAC 33:I.Chapters 45 – 57.

The Contractor may perform all required analyses in-house or may use subcontractor arrangements. The laboratory and/or their subcontractor's LELAP accreditation should cover all LDWF and LDEQ required methodologies for each test category per field of testing.

The Contractor shall have the capability to perform 100% of the tests listed in the Attachment 3, Schedule of Prices, either as primary Contractor or via accredited subcontractor.

1.1 Goals and Objectives

The goal is to assure the public that Louisiana seafood is safe for consumption. The objectives of this contract are to provide quality analytical data to support LDWF's and LDEQ's monitoring and assessment activities. This contract shall be used by LDWF and LDEQ to meet their analytical requirements for testing listed in Attachment 3, Schedule of Prices.

2.0 BACKGROUND INFORMATION

On April 20, 2010, there was a major oil spill event in the Gulf of Mexico Mississippi Canyon MC252, off the coast of Louisiana. LDWF and LDEQ have been involved in emergency response and assessment activities. Analyses related to the event have been historically conducted by British Petroleum (BP) contracted laboratories. Some of these analyses will now be the responsibility of the State of Louisiana.

3.0 CONTRACTOR TASKS

The Contractor shall serve as an analytical resource for the analyses listed in Attachment 3, Schedule of Prices, as needed by LDWF and LDEQ. LDWF and LDEQ do not guarantee a minimum amount of work to be performed by the Contractor. LDWF and LDEQ will determine and manage the scope, quantity, amount, duration, and timing of the analytical testing for the contractor.

The Contractor shall provide all personnel, equipment, materials, reagents, and facilities necessary to conduct the required analyses on all samples received by the contracted laboratory. All instruments must be in good working condition and calibrated prior to use.

3.1 Commencement Conference

A Commencement Conference shall be held between the Contractor's key personnel (and subcontractor personnel as determined to be necessary by the Contractor) and LDWF and/or LDEQ staff to discuss the commencement of the project and answer any questions regarding the contract. The Commencement Conference shall be held at LDEQ's Headquarters in Baton Rouge (602 North 5th Street). LDWF or LDEQ will schedule the conference, prepare an agenda for the meeting, take the minutes, and distribute copies of the minutes to all participants. The Contractor shall come to the conference prepared to request clarification of any issues not clearly understood. LDWF and/or LDEQ may opt to substitute a face-to-face meeting with a conference call or waive the conference entirely. No work may be performed by Contractor until the Commencement Conference has been completed or waived.

3.2 Laboratory Accreditation

In accordance with LAC 33:I.4501, any commercial laboratory (as defined in LAC 33:I.4503) shall be accredited by the Louisiana Environmental Laboratory Accreditation Program (LELAP) prior to commencing analytical work. Each such laboratory must be certified for the method/matrix/analytes necessary to perform the analytical work required in this Scope of Services, Attachment 3, Schedule of Prices and Exhibit 1. The LDWF and/or LDEQ shall not accept analytical data generated by any commercial laboratory that is not accredited by LELAP in accordance with LAC 33:I.4501 through 5915.¹ All analytical data must be submitted in a format approved by the LDWF and/or LDEQ Project Manager and shall meet the requirements of LAC 33:I.5313 and the 2003 National Environmental Laboratory Accreditation Conference (NELAC) Standards.

Any laboratory other than a commercial laboratory (as defined in LAC 33:I.4503) shall meet at a minimum the quality systems requirements found in LAC 33:I.Chapter 53 and in Chapter 5 of the 2003 NELAC Standards. All analytical data must be submitted in a format approved by the LDWF and/or LDEQ Project Manager and meet the requirements of LAC 33:I.5313 and the 2003 NELAC Standards

¹ See LAC 33:I.5911 for acceptance of accreditation from another NELAP accrediting authority.

The Contractor and/or subcontractor shall maintain LELAP accreditation for all of the analyses listed in Attachment 3, Schedule of Prices and Exhibit 1 for the duration of the contract term.

3.3 Analytical Methods and Procedures

The Contractor and proposed subcontractor(s) combined shall have the capability to perform 100% of the analyses listed in Attachment 3, Schedule of Prices, including all of the parameters listed in the Tables 1 – 4 of Exhibit 1. The Contractor shall provide analysis consistent with the methodology provided in the Attachment 3, Schedule of Prices. More information on method specific requirements can be found in NOAA's MC 252 QAP and the SINTEF method for oil identification. Proposed alternative methods must be approved by LDWF or LDEQ and LELAP accredited prior to use for samples; multiple methods may be listed for the same analytes.

Updates to analytical methods must be followed when approved by LDWF or LDEQ. All laboratory procedures shall be performed in accordance with the appropriate analytical method. Any deviations, variances or modifications must be equivalent or superior to the requirements of the analytical method and approved by LDWF or LDEQ as required in LAC 33:I.5105.B. Comprehensive documentation of these deviations, variances or modifications must be included in the narrative of the report.

The Contractor is not required to be an EPA Contract Laboratory Program (CLP) laboratory. However, as requested, the laboratory or its subcontractor(s) must be able to provide CLP or equivalent summary forms and supporting documentation for all analyses conducted. See also Section 6.1 below.

3.4 Minimum Detection Limits

The minimum detection limits (MDLs) as found in Attachment 3, Schedule of Prices are required. The Contractor must use the appropriate method to achieve the required limits. Sample quantitation limits/reporting limits shall be no higher than 3 – 10 times the MDL listed in Attachment 3, Schedule of Prices Part 1. The Contractor shall have documentation of instrument detection limits (established annually) to support its ability to achieve the method specified sample quantitation limits. If reporting limits are not specified in Attachment 3, Schedule of Prices, Part 1, the Contractor shall insert their minimum reporting limit.

Higher reporting limits attributable to interferences and high dilution factors due to sample matrices must be reported to the LDEQ Project Manager and documented and explained in the laboratory narrative. If reporting limits must be modified due to matrix problems, the report should reflect the modification.

The tables included in the Solicitation show a typical list of analytes that may be requested, i.e., the expected target analytes for each method that the Contractor is expected to perform. The analyte list may vary for each sample location, and may potentially change on a project-by-project basis.

MDL summaries are not required to be submitted with proposals, but shall comply with LELAP accreditation procedures. In accordance with LAC 33:I.5301.H.1.d each laboratory is required to

have protocols in place to evaluate test performance, such as accuracy and precision. LAC 5301.D requires the laboratory to review annually the quality assurance system. MDL studies should be done as required by the method or as required by LELAP.

Note: All data detected at or above the MDL must be reported.

3.5 Sampling Supplies

Sample containers and any necessary chemical preservatives will be provided by the Contractor. Related sampling supplies including but not limited to ice chests, bubble bags, etc. will also be provided by the Contractor. The cost of sample containers, chemical preservatives, and related supplies shall be included in the analytical prices and shall not be billed separately. Contractor must deliver/ship containers and preservatives to all of LDEQ's regional offices or other designated locations within the state. Delivery must be made within five (5) calendar days of notice.

3.6 Sample Pick Up and Transport

The Contractor must provide personnel and means of transport to pick up samples at LDEQ Headquarters, all of the LDEQ regional offices, or other designated location, as directed.

Physical addresses of known locations are provided below:

Acadiana Regional Office
111 New Center Drive
Lafayette, La. 70508

Bayou Lafourche Regional Office
110 Barataria St.
Lockport, LA 70374

Dept. of Environmental Quality (HQ/CRO)
602 N. Fifth St.
Baton Rouge, LA 70802

Southeast Regional Office
201 Evans Road, Bldg 4, Suite 420
New Orleans, LA 70123-5230

Southwest Regional Office
1301 Gadwall Street
Lake Charles, LA 70615

LDEQ Warehouse
1824 Commercial Drive
Port Allen, LA 70767

A local courier service is required, whether by direct employment or a contracted service provider. Common carrier is not an acceptable arrangement for routine operations. If the Contractor is notified before 5:00 p.m., sample pick-up shall occur the following business day. Unusual circumstance may require sample pick-up on weekends and holidays.

The Contractor shall furnish shipping containers (e.g. ice chests) for the purpose of transporting collected samples between LDWF or LDEQ and the laboratory. The cost of shipping containers and all expenses related to sample/container transport shall be included in the Contractor's analytical prices and shall not be billed separately.

The Contractor shall secure the field samples under strict chain-of-custody procedures. Contractor shall follow the packing recommendations stipulated in Section 6 of USEPA'S A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, OSWER Directive 9355.0-14, 1987, and the Department of Transportation (DOT) rules governing the transportation of hazardous materials.

The Contractor is responsible for any damages to samples once custody has been accepted, including transport to subcontractors.

3.7 Chain of Custody/Sample Receipt

The Contractors shall use the provided chain of custody form(s) a copy of which will be provided at the Commencement Conference. The chain-of-custody forms (COC) shall be included with each sampling episode. Samples will be uniquely identified as noted on the COC form.

The Contractor must document any appropriate comments or observations related to sample quality as received (e.g., if the custody seals were intact, sample temperature, and condition of samples on receipt, etc.). Any and all anomalies (i.e., temperature excursions, broken containers, etc.) must be reported to the LDEQ project manager within one working day of sample receipt, or as soon as the anomaly is detected. A written notification of any and all anomalies must be sent to the LDEQ project manager or designee within 48 hours of sample receipt. Conditions of sample receipt or other sample handling issues must be included in the narrative of the analytical report.

For all samples received by the Contractor, a sample receipt confirmation must be submitted, including a copy of the chain of custody.

Internal chain of custody records must be maintained for all containers of all samples submitted under this contract. Laboratory custody begins with sample receipt. Each exchange of custody within the laboratory must be documented with date, time, name of employee, and reason for transfer. Copies of the internal chains of custody shall be included in the data package when fully supporting documentation is requested.

3.8 Quality Assurance/Quality Control (QA/QC) Requirements

The Contractor shall maintain a QA/QC Plan that meets or exceeds all LELAP requirements. The QA/QC plan at a minimum shall meet the requirements of LA 33:1.5301. The objective of the Contractor's QA/QC plan shall be to ensure that the resulting data are acceptable. All data, including QA/QC, generated under this contract are subject to inspection and review at any time by LDWF or LDEQ or its authorized representatives.

The narrative of the report must identify any problems encountered with analytical batch or method QA/QC.

Ninety percent (90%) of all data must have acceptable QA/QC. Acceptable QA/QC is defined here as results/recoveries for any quality control sample associated with samples collected under this contract within method specified control limits, including but not limited to method blanks, blank spike and spike duplicates, method spikes and spike duplicates, surrogates, and initial calibration verification. Corrective action may be taken by LDWF or LDEQ, to the extent of contract termination, if this requirement is not met.

3.9 Internal Laboratory Verification

The objective of this project is for LDWF or LDEQ to obtain usable data. To that end, the Contractor must have Standard Operating Procedures (SOPs) that detail the appropriate level of laboratory review. Each analytical data package must be complete, legible, and logically organized. The analytical data package shall represent the best efforts of the laboratory and must have been subjected to adequate and sufficient quality review prior to submission. This provision includes all data generated by subcontractors.

3.10 Library Searches

For organic volatile and semivolatile samples, the Contractor shall execute a library search for non-target sample components for the purpose of tentative identification. For this purpose, the NIST (05/92 release or later) or equivalent mass spectral library shall be used. The guidelines for making tentative identifications are those described in Sections 11.1.2.4, Page D-36/VOA and 11.1.2.5, Page D-44/SVOA of SOW OLM04.1. Alkanes are not counted as part of the thirty (30) non-target compounds. When alkanes are tentatively identified, the estimated concentration(s), retention time(s), and class (i.e., straight-chain, branched, or cyclic) will be reported as a series in the laboratory narrative.

Library searches should be done on all volatile and semivolatile sample analyses. LDWF and LDEQ requires the 10 highest concentration Tentatively Identified Compounds (TIC's) to be reported. The TIC and estimated concentration must be included in the reports.

3.11 Sample Storage and Disposal

After all analyses are completed, the raw field samples and associated extracts shall be retained in the event that reanalysis may be required. They shall be placed in appropriate storage until (a) fourteen (14) business days after final complete deliverable is received by LWDF or LDEQ, or

(b) sample holding time expiration, whichever is sooner, unless otherwise notified in writing by LDWF or LDEQ that the samples must be retained for a longer time period. Samples shall be stored in a designated, secure, climate controlled location and its access limited to authorized personnel only. At the end of the storage period, the Contractor shall dispose of all sample material in accordance with the applicable state and federal laws and regulations, ordinances, and codes. The cost of proper disposal of all remaining sample material shall be included in the Contractor's analytical prices, and shall not be billed separately.

3.12 Turnaround Time

The Contractor shall report all analytical results to LDWF or LDEQ as soon as the data are available, but no later than 30 calendar days from sample receipt. Turnaround time commences with the laboratory's acceptance of the samples as noted by the time and date of the signature on the chain of custody form.

LDWF or LDEQ may find it necessary to obtain analytical results in less than the turnaround time stated above. In these instances, LDWF or LDEQ will notify the laboratory prior to sample receipt. A cost factor (multiplier) for expediting sample turnaround will be applied. However, if a sample designated for rapid turnaround is not completed in the time allotted, payment will be made according to the TAT multiplier equal to the actual TAT days used for report delivery, or the next highest increment for TAT multipliers, even if the delay is caused by events beyond the control of the Contractor. LDWF or LDEQ must be notified in advance if acceptance of rapid turnaround samples will cause delays in the standard turnaround time for other samples.

When necessary, the contractor must be able to pick up/receive samples late Friday and on weekends or holidays to meet holding time requirements or if samples require a quick turnaround time. If samples are routine and holding times allow, the samples may be picked up no later than 10 AM the following Monday. The Contractor must coordinate pick-up to meet short holding times.

3.13 Consultation

The Contractor shall provide technical assistance regarding sample collection, analysis, and reporting as specifically requested by LDWF or LDEQ. These issues will be considered routine and part of this Scope of Service and shall be included in the Contractor's analysis prices and shall not be separately billed.

However, LDWF or LDEQ may require analytical consulting services not otherwise defined in this Scope of Service (i.e., meetings, conferences). In those instances, arrangement to provide consulting services will be made on an "as needed" basis. Consulting conferences would primarily involve discussions concerning analytical methodology and the resulting data for samples analyzed for LDWF or LDEQ. The Contractor will prepare documents and provide background information within its areas of expertise. The Contractor shall provide organized reports, calculations, and any other documentation necessary to consult regarding the data in question.

3.14 Expert Testimony

If necessary during the term of the contract, the Contractor shall provide qualified expert witnesses for court testimony concerning analytical methodology and the resulting data for samples analyzed for LDWF or LDEQ. The Contractor will prepare documents, assist in the finding of fact, and provide background information within its areas of expertise. The Contractor shall provide representation and organized reports, calculations, and any other documentation necessary to defend the data in question. Reports and documents gathered by the Contractor for presentation must be submitted to LDWF or LDEQ for review and approval prior to their presentation.

If the Contractor is called on to provide expert testimony, a written report describing the Contractor's activities concerning the testimony shall be submitted to LDWF or LDEQ. Originals of all documents as well as copies of all calculations and visual aids used during the representation of LDWF or LDEQ shall be submitted with this report.

3.15 Laboratory Audits

The Contractor shall be available for auditing by LDWF, LDEQ or either Department's designated representative(s) at any time. In addition to the biannual LELAP audits necessary to maintain accreditation, if during the term of the contract LDWF or LDEQ suspect poor performance, LDWF and LDEQ reserve the right to require additional audits, at the expense of the Contractor.

4.0 PROJECT SCHEDULE

Samples will be submitted to the Contractor as needed by LDWF or LDEQ. Within 30 calendar days of sample receipt, a completed deliverable will be submitted to LDWF or LDEQ. Accelerated turn around times may be necessary.

Current project plans include sample collection of 60 water and 36 sediment samples each month. Each sample shall receive analysis for PAHs (extended list) as detailed in Attachment 3, Schedule of Prices and Exhibit 1. The distribution of these samples throughout the month is unknown and will vary depending on weather conditions, logistics, etc. Fingerprinting and identification of the source oil, in accordance with references 10.3 and 10.4, may be required on selected samples. LDWF or LDEQ reserves the right to increase/decrease quantities and/or analyses requested as needs require. No minimum amount of work is guaranteed.

5.0 MINIMUM QUALIFICATIONS OF THE CONTRACTOR'S PERSONNEL

The Contractor shall provide qualified personnel to accomplish the required tasks. Personnel education and experience shall meet the requirements of LAC 33:I. Chapters 45-57, Laboratory Accreditation.

6.0 PROJECT MANAGEMENT

The Contractor shall provide efficient management throughout the term of the contract to ensure the successful completion of assigned projects. Project management includes, but is not limited to, meetings, supervision, record-keeping, preparation and submission of submittals and deliverables, and contract administration. The duties and responsibilities for project management shall continue throughout the term of the contract. The resources and methodology for project management activities shall be the responsibility of the Contractor.

LDWF and LDEQ shall be notified, in accordance of LAC 33:I.4715.C and LAC 33:I.5705, of the revocation of accreditation by any state, and will result in automatic suspension of LELAP accreditation. Loss of LELAP accreditation shall be reason for termination of this contract.

If the samples to be analyzed by the Contractor are known or suspected to contain hazardous materials, substances, or waste, it is the Contractor's responsibility to take all necessary measures to ensure his employees' or subcontractors' employees' safety.

Project management shall include, but not be limited to, the following activities:

- (1) supervision of the Contractor's personnel;
- (2) contract administration:
 - (a) invoicing;
 - (b) resolving disputes between the Contractor and LDWF; and
 - (c) compliance by the Contractor with all contract clauses and conditions;
- (3) record-keeping; and
- (4) preparation and submission of submittals and deliverables, including but not limited to, final analytical reports.

The Contractor shall assign a Project Manager to be designated during the contract commencement conference that will represent the Contractor's organization and to manage the project. LDWF and/or LDEQ reserves the right to approve the person assigned as Project Manager, as well as require the replacement of the Contractor's Project Manager should he/she be found unresponsive to LDWF's or LDEQ's inquiries.

The Contractor's Project Manager shall be responsible for project monitoring and compliance. The Contractor's Project Manager must keep the LDWF and LDEQ Project Manager informed of the project status through written informal communication.

The Contractor shall assign a Technical Liaison, to be designated during the contract commencement conference that will assist with questions regarding laboratory procedures or specific analyses. The technical liaison shall be knowledgeable of the provision of this Scope of Services, in laboratory procedures and methodology, and the day-to-day operation of the facility.

LDWF or LDEQ will provide Data Quality Objectives (DQOs) to the laboratory when available. When interferences or dilutions will yield marginal results, those shall be reported to LDWF or LDEQ as soon as possible. The technical liaison shall then propose alternative accredited analytical methods to accomplish the data quality objectives of the project.

6.1 Deliverables

The Contractor shall prepare and submit one (1) electronic copy of the analytical results (with official laboratory representative signature) and one (1) LDEQ Electronic Data Deliverable (EDD) as soon as the data are available but no longer than thirty (30) calendar days from receipt of samples to the LDWF and LDEQ Project Managers. The Prime Contractor must submit all deliverables generated under this contract. No deliverables will be accepted directly from subcontractors. The analytical reports and EDDs shall be sent to the following email addresses: deqlabinfo@la.gov and choar@wlf.la.gov.

If hard copy reports are required, they shall be sent an address to be determined at a later date.

Unreasonable mailing delays shall be remedied by the Contractor at his expense. Analytical reports sent by overnight means or by courier shall be directed to the address determined above.

The Contractor must be capable of producing two types of data deliverables to meet the requirements of this Scope of Services – a fully-supported data package and a summary report. Refer to the LDEQ public web page for LDEQ's Electronic Data Deliverable (EDD) Submittal Requirements Manual and List of Valid Values:
www.deq.louisiana.gov/portal/tabid/2839/default.aspx.

Criteria for rejection of deliverables include, but are not limited to:

- Not meeting holding time
- Contractor using incorrect method
- Contractor QC not according to method
- Contractor QC not acceptable
- Improper reporting (including no EDD, no raw data)
- Incorrect EDDs

Failure to meet the deliverable criteria may result in penalties assessed to the Contractor. These penalties may include reimbursement/non-payment for analytical work.

LDWF or LDEQ will review the report, provide comments as necessary, and forward any comments to the Contractor. The Contractor shall address all comments and submit a final document for acceptance. Upon completion of the contract, the Contractor shall return all materials provided by LDWF or LDEQ for use during this contract.

6.2 Data Packages

The Contractor shall have the capability of producing summary or fully-supported data packages as directed by LDWF or LDEQ.

It is anticipated that less than 50% of analyses will require fully-supported data packages; however, this could be greater based upon the needs of LDWF and/or LDEQ. The Contractor must be able to provide these for any analyses that are conducted.

Fully-supported data packages require submitting all raw data and the associated CLP or equivalent summary forms. The summary report does not require attaching raw data.

The narrative of both the summary and full-supported data reports must address any issues with chain-of-custody, preservation, condition of the sample upon receipt by laboratory personnel, unacceptable QA/QC, and any other notable concerns or issues with the sample and its analytical results.

Preparation methods, as well as any clean up procedures must be identified in the final report.

When revisions/corrections are requested, the narrative must be revised to describe the reason for change.

6.2.1 Summary Reports

Summary reports must include at a minimum all requirements of LAC 33:I:5313 for reporting. Copies of the chain of custodies must also be included. The data deliverable package shall be one complete document, paginated, with reproduction quality such that all pages are legible. The EDD shall be checked with the EQUIS[®] Electronic Data Processor (EDP) and free of errors. The report must include the laboratory certification number, the date of report preparation, a cross-reference between the LDEQ sample identifications and the laboratory identifications. The report must define any data qualifiers contained in the analytical results. Associated QC data must be included in the analytical report and the EDD.

6.2.2 Fully-Supported Data Packages

Fully supported data packages must contain all of the required information as the summary report with the additional CLP or equivalent forms and all supporting raw and calculated data. Supporting raw data includes, but is not limited to, extraction logs, preparation/digestion logs, quantitation reports, chromatograms, instrument analysis reports, analysis/sequence run logs, percent moisture logs, weight logs, bench sheets, standard and reagent logs, sample receipt checklist(s), etc. Raw data for all samples (including any and all dilutions) and any associated method or batch quality control samples must be included. Refer to the applicable CLP SOW for more detailed descriptions of the required forms (<http://www.epa.gov/superfund/programs/clp/>). Custom forms equivalent to the CLP forms are acceptable.

7.0 STATE'S RESPONSIBILITIES

As part of its responsibilities under the contract, LDWF or LDEQ shall:

- (1) provide points of contact (liaisons) for technical and contract activities (LDWF and LDEQ Project Manager and Contract Manager);

- (2) collect samples, label them, and prepare the samples for pickup/shipment, with completed chain of custody form(s);
- (3) provide locations for sample pick up;
- (4) when possible, indicate the expected concentration (high vs. low) on the chain of custody form;
- (5) indicate when fully supported data packages are required;
- (6) answer questions about a given sample as necessary;
- (7) monitor the Contractor's quality assurance and quality control activities; and
- (8) review, require revision as necessary, and accept deliverables.

LDWF and LDEQ will be available for assistance to the Contractor in solving problems or answering questions that may arise and will meet with the Contractor as necessary. However, LDWF and LDEQ shall not be responsible for the Contractor's performance of the work and reserves the right to reject deficient work.

8.0 MONITORING AND METHODS TO MEASURE PERFORMANCE

The LDWF and LDEQ Project Managers will monitor the progress of the Contractor during the contract by:

- (1) monitoring the Contractor's work through telephone or email communication, or meetings when necessary;
- (2) ensuring that deliverables meet all requirements and are submitted within the timeframe of the contract;
- (3) reviewing, requiring correction as necessary, and approving all deliverables and submittals; and
- (4) monitoring the status of the laboratory's LELAP accreditation as necessary.

LDWF and LDEQ will measure the successful performance of the Contractor by reviewing and evaluating the acceptability of all deliverables and submittals.

9.0 MEASUREMENT AND PAYMENT

The Contractor shall be compensated for the tasks required in this Scope of Services according to the rates specified in Attachment 3, Schedule of Prices.

Payment for work performed under this contract will not exceed the agreed contract amount. Additional work performed by the Contractor without written authorization from LDWF in the form of an approved contract amendment, will not entitle him to an increase in contract price.

9.1 Commencement Conference

The commencement conference payment line item shall include all activities and resources necessary for attendance by the Contractor at the commencement conference to be held at LDEQ's Headquarters in Baton Rouge and will last approximately two (2) hours. Payment shall be made in one lump sum in accordance with the rates provided in Attachment 3, Schedule of Prices for a face to face meeting, or the lump sum for a conference call, as directed by LDWF or LDEQ. Attendance of the Contractor's Project Manager is mandatory. Payment will be made by LDWF following completion of the conference and submission of the Contractor's invoice.

9.2 Payment for Analyses

The Contractor shall be paid by LDWF for actual analyses performed upon approval of compliant, timely deliverables according to the unit rates listed in Attachment 3, Schedule of Prices. Untimely, incomplete deliverables may be subject to reimbursement/non-payment for analyses. Payment for sample analysis will not be made until completion of all work in that sample delivery group (SDG).

Prices listed in Attachment 3, Schedule of Prices shall be for normal 30-day turnaround time and summary/standard reports. When rapid turnaround time (TAT) is required, as directed by LDWF or LDEQ, the appropriate TAT multiplier shall be applied to the base analytical rates. If the number of actual TAT days falls between two of the multiplier options, payment will be made according to the higher number of TAT days.

When fully-supported data packages are required, as noted on the chain of custody or advised by the LDWF and/or LDEQ Project Managers, the multiplier for fully-supported data packages multiplier shall be applied to the base analytical rates in Attachment 3, Schedule of Prices.

Sample preparation and clean-up procedure costs, including but not limited to extraction, preparation, distillation, digestion, clean-up, etc. as applicable, shall be included in the Contractor's analytical prices and not billed separately. No separate payments will be made for these procedures.

The prices of dilutions are to be included in the Contractor's analytical prices and not billed separately.

Multipliers shown in Attachment 3, Schedule of Prices, Part 2, shall apply to all analyses listed in the Attachment 3, Schedule of Prices, Part 1. It is acceptable for more than one multiplier to be applied (i.e., rapid TAT and fully-supported data). All multipliers shall be applied to the base unit rates.

9.3 Payment for Expert Testimony or Consulting Services

The Consulting Services payment item shall be according to the hourly rate in Attachment 3, Schedule of Prices, and shall include all direct and indirect costs related to this task. Payment shall be limited to actual hours as documented on signed time sheets. Invoices for consulting services shall be accompanied by a written request by the LDWF or LDEQ Project Manager for reimbursable consulting services. The hourly consultation rate is not to be used for routine correspondence between LDWF or LDEQ and the Contractor related to samples and analysis.

The Expert Testimony payment item shall be according to the hourly rate in Attachment 3, Schedule of Prices, and shall include all direct and indirect costs related to this task. Payment shall be limited to actual hours as documented on signed time sheets or as evidenced by the duration of hearings and/or court cases.

9.4 Travel Time for Expert Testimony or Consulting

Travel time for Consulting Services or Expert Testimony as directed by LDWF or LDEQ shall be reimbursed according to the rate specified in Attachment 3, Schedule of Prices.

Travel and other allowable expenses shall be reimbursed in accordance with the Division of Administration State General Travel Regulations, within the limits established for State Employees, as defined in Division of Administration Policy and Procedure Memorandum No. 49. <http://www.doa.louisiana.gov/osp/travel/travelpolicy.htm>

10.0 RESOURCES

Valuable information concerning this SFS can be found using the following links:

- 10.1 LDEQ EDD Submittal Requirements Manual and List of Valid Values
www.deq.louisiana.gov/portal/tabid/2839/default.aspx
- 10.2 CLP Statement of Work: <http://www.epa.gov/superfund/programs/clp/>
- 10.3 Per Daling and Liv-Guri Faksness. 2002. Laboratory and reporting instructions for the CEN/BT/TF 120 Oil Spill Identification – Round Robin Test – May 2001. SINTEF Report.
- 10.4 Mississippi Canyon 252 (Deepwater Horizon) Natural Resource Damage Assessment Analytical Quality Assurance Plan. NOAA, v2.1, July 2010.

**ATTACHMENT 3
SCHEDULE OF PRICES**

**“Analytical and Consulting Services - Seafood Safety Response Related-Organics”
Louisiana Department of Wildlife and Fisheries and Louisiana Department of Environmental Quality**

Part 1: Analytical Prices

Analytical Rates in Part 1 should be based on summary reports and standard 30 day turnaround time.

Line Item	Description	Analytical Method	Minimum Detection Limit	Payment Unit	No. of Units*	Unit Rate	Analyzing Laboratory
1a	PAHs including alkyl homologues by gas chromatography with low resolution mass spectrometry using selected ion monitoring (GC/MS-SIM). The analytical procedure is based on EPA Method 8270D with the GC and MS operating conditions optimized for separation and sensitivity of the target analytes. Alkyl PAH homologues are quantified using a response factor assigned from the parent PAH compound. Analytes and associated response factors are listed in Exhibit 1 Table 1.	EPA 8270D (GC/MS-SIM) or LDEQ approved method	Water 1-5 ng/L	per sample	360	\$	
1b			Sediment 0.1-0.5 ng/g dry weight	per sample	216	\$	
2a	Extended list of VOCs for a specialized fingerprinting analysis of paraffins, isoparaffins, aromatics, naphthenes, and olefins (PIANO) by GC/MS. Analytes are provided in Exhibit 1 Table 2.	EPA 8260B (GC/MS) or LDEQ approved method	Water 0.2 - 2.0 ug/L	per sample	2	\$	
2b			Sediment 0.1 - 10 ng/g	per sample	2	\$	
3a	Quantitative analysis (absolute concentrations of target analytes) of petroleum biomarkers by GC/MS-SIM. The target analyte list for quantitative biomarkers is provided in Exhibit 1 Table 3. This list may be expanded if warranted.	GC/MS-SIM or LDEQ approved method	Water 10 ng/L	per sample	2	\$	
3b			Sediment 2 ug/kg dry weight	per sample	2	\$	

4a	Qualitative analysis of petroleum biomarkers by GC/MS-SIM with monitoring of selected ions (m/z) as provided in Exhibit 1 Table 4. Patterns/fingerprints must also be interpreted by the laboratory to identify source oil. Since no concentration data are generated by qualitative analysis the results are reported as hardcopy PDF files of each ion over the appropriate retention time(s) and scale. Costs for interpretation of the fingerprints for the source oil must also be included in the price listed for qualitative analysis.	GC/MS-SIM or LDEQ approved method	Water	per sample	2	\$	
4b			Sediment	per sample	2	\$	

All analytical rates shall include all direct costs (labor, supplies, equipment, incidentals and expendables, duplication/copying, communications, postage, shipping and handling, transportation, taxes, etc.), all indirect costs (fringe, overhead, general and administrative costs), travel expenses associates with each line, and profit.

*Estimated quantities are based on an average of 60 water and 36 sediment samples per month for six months. Quantities may increase/decrease as needed by LDWF and/or LDEQ.

Part 2: Multipliers

To be applied to base analytical rates when necessary. Fill in surcharge percentage only, not total percentage (i.e. if 5%, fill in 5%, not 105%).

Line Item	Description	Payment Unit	Unit Rate
5	Fully supported data package	% per Sample Delivery Group	%
6	Accelerated Turn Around Time - 3 days	% per Sample Delivery Group	%
7	Accelerated Turn Around Time - 7 days	% per Sample Delivery Group	%
8	Accelerated Turn Around Time - 14 days	% per Sample Delivery Group	%
9	Accelerated Turn Around Time - 21 days	% per Sample Delivery Group	%

Part 3: Other Rates

Line Item	Description	Payment Unit	No. of Units	Unit Rate
10	Commencement Conference - at LDEQ HQ	Lump Sum	1	\$
11	Commencement Conference - conference call	Lump Sum	1	\$
12	Consulting (i.e. meetings at DEQ, etc.)	Hour		\$
13	Expert Testimony	Hour		\$
14	Travel Time for Expert Testimony or Consulting ¹	Hour		\$

¹Travel and other allowable expenses shall be reimbursed in accordance with the Division of Administration State General Travel Regulations, within the limits established for State Employees, as defined in Division of Administration Policy and Procedure Memorandum No. 49,
<http://www.doa.louisiana.gov/osp/travel/travelpolicy.htm>.

LDWF reserves the right to transfer among existing "schedule of prices" line items. The cumulative transfers cannot exceed 10% of the total contract amount. Supporting documentation must accompany each transfer request.

ALL BLANKS MUST BE COMPLETED.

Exhibit 1
Parameter List

Table 1 – Extended PAH (Parent and Alkyl Homologues) and Related Compounds

Code	Compound	RF Source	Code	Compound	RF Source	Code	Compound	RF Source
D0	cis/trans-Decalin		PA4	C4-Phenanthrenes/Anthracenes	P0	BEP	Benzo[e]pyrene	
D1	C1-Decalins	D0 or tD06	RET	Retene	RET or P0	BAP	Benzo[a]pyrene	
D2	C2-Decalins	D0 or tD0	DBT0	Dibenzothiophene		PER	Perylene	
D3	C3-Decalins	D0 or tD0	DBT1	C1-Dibenzothiophenes	DBT0	IND	Indeno[1,2,3-cd]pyrene	
D4	C4-Decalins	D0 or tD0	DBT2	C2-Dibenzothiophenes	DBT0	DA	Dibenz[a,h]anthracene	
BT0	Benzothiophene		DBT3	C3-Dibenzothiophenes	DBT0	GHI	Benzo[g,h,i]perylene	
BT1	C1-Benzo(b)thiophenes	BT0	DBT4	C4-Dibenzothiophenes	DBT0			
BT2	C2-Benzo(b)thiophenes	BT0	BF	Benzo(b)fluorene	BF or FL0	4MDT	4-Methyldibenzothiophene	DBT0
BT3	C3-Benzo(b)thiophenes	BT0	FL0	Fluoranthene		2MDT	2/3-Methyldibenzothiophene	DBT0
BT4	C4-Benzo(b)thiophenes	BT0	PY0	Pyrene		1MDT	1-Methyldibenzothiophene	DBT0
N0	Naphthalene		FP1	C1-Fluoranthenes/Pyrenes	FL0 or PY0	3MP	3-Methylphenanthrene	P0
N1	C1-Naphthalenes	N0	FP2	C2-Fluoranthenes/Pyrenes	FL0 or PY0	2MP	2/4-Methylphenanthrene	P0
N2	C2-Naphthalenes	N0	FP3	C3-Fluoranthenes/Pyrenes	FL0 or PY0	2MA	2-Methylantracene	P0
N3	C3-Naphthalenes	N0	FP4	C4-Fluoranthenes/Pyrenes	FL0 or PY0	9MP	9-Methylphenanthrene	P0
N4	C4-Naphthalenes	N0	NBT0	Naphthobenzothiophenes		1MP	1-Methylphenanthrene	P0
B	Biphenyl		NBT1	C1-Naphthobenzothiophenes	NBT0		2-Methylnaphthalene	
DF	Dibenzofuran		NBT2	C2-Naphthobenzothiophenes	NBT0		1-Methylnaphthalene	
AY	Acenaphthylene		NBT3	C3-Naphthobenzothiophenes	NBT0		2,6-Dimethylnaphthalene	
AE	Acenaphthene		NBT4	C4-Naphthobenzothiophenes	NBT0		1,6,7-Trimethylnaphthalene	
F0	Fluorene		BA0	Benz[a]anthracene				
F1	C1-Fluorenes	F0	C0	Chrysene/Triphenylene				
F2	C2-Fluorenes	F0	BC1	C1-Chrysenes	C0		Other	
F3	C3-Fluorenes	F0	BC2	C2-Chrysenes	C0		Carbazole	
A0	Anthracene		BC3	C3-Chrysenes	C0		C30-Hopane	
P0	Phenanthrene		BC4	C4-Chrysenes	C0			
PA1	C1-Phenanthrenes/Anthracenes	P0	BBF	Benzo[b]fluoranthene				
PA2	C2-Phenanthrenes/Anthracenes	P0	BJKF	Benzo[j,k]fluoranthene	BKF			
PA3	C3-Phenanthrenes/Anthracenes	P0	BAF	Benzo[a]fluoranthene	BKF or BAF			

Table 2 – C5 – C13 PIANO Volatile Organic Compounds List

Abbrev.	Analyte	Abbrev.	Analyte	Abbrev.	Analyte
IP	Isopentane	MCYH	Methylcyclohexane	C10	Decane
1P	1-Pentene	25DMH	2,5-Dimethylhexane	124TMB	1,2,4-Trimethylbenzene
2M1B	2-Methyl-1-butene	24DMH	2,4-Dimethylhexane	SECBUT	sec-Butylbenzene
C5	Pentane	223TMP	2,2,3-Trimethylpentane	1M3IPB	1-Methyl-3-isopropylbenzene
T2P	2-Pentene (trans)	234TMP	2,3,4-Trimethylpentane	1M4IPB	1-Methyl-4-isopropylbenzene
C2P	2-Pentene (cis)	233TMP	2,3,3-Trimethylpentane	1M2IPB	1-Methyl-2-isopropylbenzene
TBA	Tertiary butanol	23DMH	2,3-Dimethylhexane	IN	Indan
CYP	Cyclopentane	3EH	3-Ethylhexane	1M3PB	1-Methyl-3-propylbenzene
23DMB	2,3-Dimethylbutane	2MHEP	2-Methylheptane	1M4PB	1-Methyl-4-propylbenzene
2MP	2-Methylpentane	3MHEP	3-Methylheptane	BUTB	n-Butylbenzene
MTBE	MTBE	T	Toluene	12DM4EB	1,2-Dimethyl-4-ethylbenzene
3MP	3-Methylpentane	2MTHIO	2-Methylthiophene	12DEB	1,2-Diethylbenzene
1HEX	1-Hexene	3MTHIO	3-Methylthiophene	1M2PB	1-Methyl-2-propylbenzene
C6	Hexane	1O	1-Octene	14DM2EB	1,4-Dimethyl-2-ethylbenzene
DIPE	Diisopropyl Ether (DIPE)	C8	Octane	C11	Undecane
ETBE	Ethyl Tertiary Butyl Ether (ETBE)	12DBE	1,2-Dibromoethane	13DM4EB	1,3-Dimethyl-4-ethylbenzene
22DMP	2,2-Dimethylpentane	EB	Ethylbenzene	13DM5EB	1,3-Dimethyl-5-ethylbenzene
MCYP	Methylcyclopentane	2ETHIO	2-Ethylthiophene	13DM2EB	1,3-Dimethyl-2-ethylbenzene
24DMP	2,4-Dimethylpentane	MPX	p/m-Xylene	12DM3EB	1,2-Dimethyl-3-ethylbenzene
12DCA	1,2-Dichloroethane	1N	1-Nonene	1245TMP	1,2,4,5-Tetramethylbenzene
CH	Cyclohexane	C9	Nonane	PENTB	Pentylbenzene
2MH	2-Methylhexane	STY	Styrene	C12	Dodecane
B	Benzene	OX	o-Xylene	N0	Naphthalene
23DMP	2,3-Dimethylpentane	IPB	Isopropylbenzene	BT0	Benzothiophene
THIO	Thiophene	PROPB	n-Propylbenzene	MMT	MMT
3MH	3-Methylhexane	1M3EB	1-Methyl-3-ethylbenzene	C13	Tridecane
TAME	TAME	1M4EB	1-Methyl-4-ethylbenzene	2MN	2-Methylnaphthalene
1H	1-Heptene/1,2-DMCP (trans)	135TMB	1,3,5-Trimethylbenzene	1MN	1-Methylnaphthalene
ISO	Isooctane	1D	1-Decane		
C7	Heptane	1M2EB	1-Methyl-3-isopropylbenzene		

Table 3 – Quantitative Analysis of Petroleum Biomarkers

Compound	Quant Ion m/z	Compound	Quant ion m/z
C23 Tricyclic Terpane (T4)	191	Tetrakishomohopane-22S (T32)	191
C24 Tricyclic Terpane (T5)	191	Tetrakishomohopane-22R (T33)	191
C25 Tricyclic Terpane (T6)	191	Pentakishomohopane-22S (T34)	191
C24 Tetracyclic Terpane (T6a)	191	Pentakishomohopane-22R (T35)	191
C26 Tricyclic Terpane-22S (T6b)	191	13b(H),17a(H)-20S-Diacholestane (S4)	217
C26 Tricyclic Terpane-22R (T6c)	191	13b(H),17a(H)-20R-Diacholestane (S5)	217
C28 Tricyclic Terpane-22S (T7)	191	13b,17a-20S-Methyldiacholestane (S8)	217
C28 Tricyclic Terpane-22R (T8)	191	14a(H),17a(H)-20S-Cholestane (S12)	217
C29 Tricyclic Terpane-22S (T9)	191	14a(H),17a(H)-20R-Cholestane (S17)	217
C29 Tricyclic Terpane-22R (T10)	191	13b,17a-20R-Ethyldiacholestane (S18)	217
18a-22,29,30-Trisnorhopane-Ts (T11)	191	13a,17b-20S-Ethyldiacholestane (S19)	217
C30 Tricyclic Terpane-22S (T11a)	191	14a,17a-20S-Methylcholestane (S20)	217
C30 Tricyclic Terpane-22R (T11b)	191	14a,17a-20R-Methylcholestane (S24)	217
17a(H)-22,29,30-Trisnorhopane-Tm (T12)	191	14a(H),17a(H)-20S-Ethylcholestane (S25)	217
17a/b,21b/a 28,30-Bisnorhopane (T14a)	191	14a(H),17a(H)-20R-Ethylcholestane (S28)	217
17a(H),21b(H)-25-Norhopane (T14b)	191	14b(H),17b(H)-20R-Cholestane (S14)	217
30-Norhopane (T15)	191	14b(H),17b(H)-20S-Cholestane (S15)	217
18a(H)-30-Norneohopane-C29Ts (T16)	191	14b,17b-20R-Methylcholestane (S22)	217
17a(H)-Diahopane (X)	191	14b,17b-20S-Methylcholestane (S23)	217
30-Normoretane (T17)	191	14b(H),17b(H)-20R-Ethylcholestane (S26)	217
18a(H)&18b(H)-Oleananes (T18)	191	14b(H),17b(H)-20S-Ethylcholestane (S27)	217
Hopane (T19)	191	C26,20R- +C27,20S- triaromatic steroid	231
Moretane (T20)	191	C28,20S-triaromatic steroid	231
30-Homohopane-22S (T21)	191	C27,20R-triaromatic steroid	231
30-Homohopane-22R (T22)	191	C28,20R-triaromatic steroid	231
30,31-Bishomohopane-22S (T26)	191		
30,31-Bishomohopane-22R (T27)	191		
30,31-Trishomohopane-22S (T30)	191		
30,31-Trishomohopane-22R (T31)	191		

Table 4 – Qualitative Analysis of Petroleum Biomarkers (monitoring mass/charge ion)

<i>n</i> -Alkylcyclohexanes (m/z 83)	Regular Steranes (m/z 217)
<i>n</i> -Alkanes (m/z 85)	Rearranged β,β -steranes (m/z 218)
Diamondoids (m/z 135, 187)	Methyl steranes (m/z 232, 245)
Sesquiterpanes (m/z 109, 123)	Methyl and triaromatic steroids (m/z 231)
Isoprenoids (m/z 183)	Monoaromatic steroids (m/z 253)
Triterpanes (m/z 191)	Diasteranes (m/z 259)